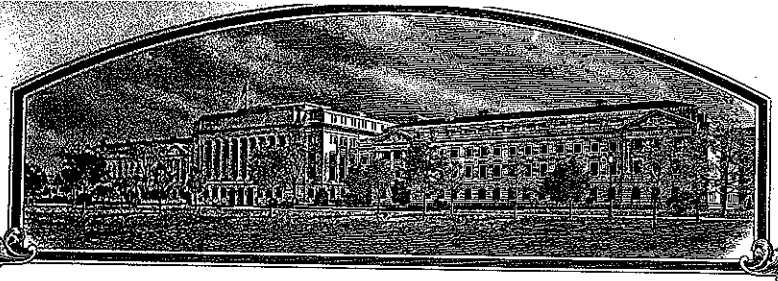
200600283

No.



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Virginia Tech Intellectual Properties, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'176'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this sixth day of February, in the year two thousand and seven.*

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
Virginia Tech Intellectual Properties, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
VA99W-176

3. VARIETY NAME
176

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Virginia Tech Intellectual Properties, Inc.
2200 Kraft Drive, Suite 1050
Blacksburg, VA 24060

5. TELEPHONE *(include area code)*
540-951-9374

6. FAX *(include area code)*
540-951-5292

FOR OFFICIAL USE ONLY

PVPO NUMBER
200600283

FILING DATE
September 5, 2006

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Corporation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION
Virginia

9. DATE OF INCORPORATION
June 20, 1985

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*

Carl A. Griffey
Crop and Soil Environmental Sciences
Virginia Tech
Blacksburg, VA 24061-0404

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 4382.00
DATE 9-05-2006

CERTIFICATION FEE:
$ 768.00
DATE 12-19-2006

11. TELEPHONE *(Include area code)*
540-231-9789

12. FAX *(Include area code)*
540-231-3431

13. E-MAIL
Cgriffey@vt.edu

14. CROP KIND *(Common Name)*
Wheat, Common

15. GENUS AND SPECIES NAME OF CROP
Triticum aestivum

16. FAMILY NAME *(Botanical)*
Triticeae

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES X NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

a. X Exhibit A. Origin and Breeding History of the Variety
b. X Exhibit B. Statement of Distinctness
c. X Exhibit C. Objective Description of Variety
d. X Exhibit D. Additional Description of the Variety *(Optional)*
e. X Exhibit E. Statement of the Basis of the Owner's Ownership
f. X Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. X Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
X YES *(If "yes", answer items 20 and 21 below)* ☐ NO *(If "no", go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? X YES ☐ NO
IF YES, WHICH CLASSES? X FOUNDATION X REGISTERED X CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES X NO
IF YES, SPECIFY THE NUMBER 1,2,3, *etc.* FOR EACH CLASS.
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
X YES October 2005 NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES X NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER	SIGNATURE OF OWNER
Mark S. Coburn	
NAME *(Please print or type)*	NAME *(Please print or type)*
MARK S. COBURN	
CAPACITY OR TITLE	DATE
EXECUTIVE VICE PRESIDENT	5/5/06
CAPACITY OR TITLE	DATE

INSTRUCTIONS 200600283

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $2,705 ($320 filing fee and $2,385 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvp.htm

ITEM

18a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

21. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

22. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

A limited amount of Certified Seed of wheat variety '176' was sold to producers in October 2005 in the U.S.A.

23. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. http://www.ams.usda.gov/lsg/seed.htm

18A. Exhibit A: Origin and Breeding History

Genealogy and Breeding Method. Wheat variety 176, formerly tested and designated VA99W-176, was derived from the cross VA91-54-343/VA92-52-52. The parentage of VA91-54-343 is IN71761A4-31-5-48 // VA71-54-147 (CItr 17449) / 'McNair 1813'. Wheat line IN71761A4-31-5-48 was developed by Purdue University and has the pedigree 'Benhur'/3/'Arthur'/'Knox' type line with gene H5 for Hessian fly resistance/4/'Beau'*2/3/Arthur*2//'Riley'/ 'Bulgaria 88'. Parentage of VA92-52-52 is 'Adria' / 2*'Saluda'. The cross was made in spring 1992, and the F_1 generation was grown in the field as a single 4ft headrow in 1993 to produce F_2 seed. The population was advanced from the F_2 to F_5 generation using a modified bulk breeding method.

Population Advancement and Selection of the Variety. Wheat spikes were selected from the population in each segregating generation (F_2-F_4) on the basis of absence of obvious disease, early maturity, short straw and desirable head shape and size. Selected spikes were threshed in bulk, and the seed was planted in 225ft^2 blocks in the fall of each year. Spikes selected from the F_5 bulk where threshed individually and planted in separate 4ft headrows. Wheat variety 176 was derived as a bulk of one of these F_6 headrows selected in 1998. The variety was tested as entry 176 in non-replicated observation yield tests in 1999 and was formerly designated VA99W-176. This line was evaluated in replicated preliminary yield tests conducted in VA and NC in 2000 (Table 1). Performance of variety 176 (listed as VA99W-176 in tables) was evaluated for three years (2001-2003) under conventional (Tables 2-6) and no-till (Tables 7-11) management systems in Virginia's Official Variety Trial.

Multiplication and Purification. During the 2002-2003 growing season, 354 headrows of wheat variety 176 were planted and evaluated for homogeneity and trueness of type. Sixty-three variant rows, comprised of plant types that were taller (8%), shorter (3%), heterogeneous for plant height (4.5%), taller and later heading (0.3%) and plant types with yellow green plant color (0.6%), compact heads (0.6%), long awns (0.6%), and blue head color (0.3%), were removed prior to harvest. The remaining 291 rows were harvested in bulk to comprise the Breeder seed of variety 176. During fall 2003, approximately 2 bu of Breeder seed were planted on one acre at the VCIA Foundation Seed Farm from which approximately 60 bu of Foundation seed were produced. While variety 176 has remained stable and uniform in composition through the last two generations of multiplication, variants noted during the production of Foundation seed included up to 1% taller plants and 0.5% plants having spikes with long awns. The Foundation seed was sown over a larger area in fall 2004 for further multiplication and subsequently made available to seedsmen in fall 2005.

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18B. Exhibit B: Novelty Statement

Wheat variety 176 is uniquely different from all known cultivars which it has been tested among, but is most similar to 'USG 3209' whose parentage also is comprised of 'Saluda'. In contrast to their common ancestor Saluda which is susceptible to powdery mildew (*Blumeria graminis*) isolates having virulence for resistance gene *Pm*3a, both variety 176 and USG 3209 are resistant to powdery mildew. USG 3209 possesses the 1BL.1RS wheat/rye translocation and the gene *Lr*26 governing resistance to leaf rust (*Puccinia triticina*), while variety 176 possesses neither. Seedlings of USG3209 are resistant to leaf rust race TNRJ, which lacks virulence for *Lr*26, while those of variety 176 are susceptible. Seedlings of USG3209 are resistant to Hessian fly [*Mayetiola destructor* (Say)] biotypes B and E, while those of variety 176 are resistant to biotype E and susceptible to biotype B. Seedlings of variety 176 are susceptible to race TTTT of stem rust (*Puccinia graminis*), while those of USG3209 are resistant. Plant height of variety 176 is consistently taller (2-4 inches) than that of USG 3209 (Tables 1-11). Coleoptiles of variety 176 lack anthocyanin and are clear in color, while those of USG 3209 are light red in color.

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REPRODUCE LOCALLY. Include form number and date on all reproductions.

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S)

Virginia Tech Intellectual Properties, Inc.

ADDRESS *(Street and No. or RD No., City, State, and Zip Code)*

2200 Kraft Drive, Suite 1050
Blacksburg, VA 24060

FOR OFFICIAL USE ONLY

PVPO NUMBER 200600283

VARIETY NAME

176

TEMPORARY OR EXPERIMENTAL DESIGNATION

VA99W-176

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [0][9] or [0][9]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used:_____

_____Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1]

1=Common
2=Durum
3=Club
4=Other (SPECIFY) : _____

2. VERNALIZATION:

[2]

1=Spring
2=Winter
3=Other (SPECIFY) : _____

3. COLEOPTILE ANTHOCYANIN:

[1] **1 = Absent** **2 = Present**

4. JUVENILE PLANT GROWTH:

[1] **1 = Prostrate 2 = Semi-erect 3 = Erect**

5. PLANT COLOR (boot stage):

[2]

1 = Yellow-Green
2 = Green
3 = Blue-Green

6. FLAG LEAF (boot stage):

[1] **1 = Erect**
2 = Recurved

[2] **1 = Not Twisted**
2 = Twisted

[1] **1 = Wax Absent**
2 = Wax Present

7. EAR EMERGENCE:

[1][2][0] **Number of Days (Average)**

[0][0] **Number of Days Earlier Than** _____ *

Same as Sisson *

[N][A] **Number of Days Later Than** Not later than any cultivar evaluated with *

*** Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial**

8. ANTHER COLOR:

[1]

1 = Yellow
2 = Purple

9. PLANT HEIGHT (from soil to top of head, excluding awns):

[ ][8][9] cm (Average)

[0][5] cm Taller Than Sisson *

Same as _____ *

[0][2] cm Shorter Than Pioneer Brand 26R24 *

10. STEM:

A. ANTHOCYANIN

[1]

1= Absent
2 = Present

B. WAXY BLOOM

[1]

1 = Absent
2 = Present

C. HAIRINESS (last internode of rachis)

[1]

1 = Absent
2 = Present

D. INTERNODE

[1] 1 = Hollow 2 = Semi-solid 3 = Solid

[5] Number of Nodes

E. PEDUNCLE

[3] 1 = Erect 2 = Recurved 3 = Semi-erect

[1][2] cm Length

F. AURICLE

[1] Anthocyanin 1 = Absent 2 = Present

[2] Hair 1 = Absent 2 = Present

11. HEAD (at Maturity):

A. DENSITY

[2]

1 = Lax
2 = Middense (Laxidense)
3 = Dense

B. SHAPE

[1]

1 = Tapering
2 = Strap
3 = Clavate
4 = Other (SPECIFY):_____

C. CURVATURE

[2]

1 = Erect
2 = Inclined
3 = Recurved

D. AWNEDNESS

[2]

1 = Awnless
2 = Apically Awnletted
3 = Awnletted
4 = Awned

LD

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12. GLUMES (at Maturity):

A. COLOR

[2]
1 = White
2 = Tan
3 = Other (SPECIFY) : _____

B. SHOULDER

[4]
1 = Wanting 2 = Oblique
3 = Rounded 4 = Square
5 = Elevated 6 = Apiculate
7 = Other (SPECIFY):_____

C. SHOULDER WIDTH

[2]
1 = Narrow
2 = Medium
3 = Wide

D. BEAK

[2]
1 = Obtuse
2 = Acute
3 = Acuminate

E. BEAK WIDTH

[2]
1 = Narrow
2 = Medium
3 = Wide

F. GLUME LENGTH

[2]
1 = Short (ca. 7mm)
2 = Medium (ca. 8mm)
3 = Long (ca. 9mm)

G. WIDTH

[2]
1 = Narrow (ca. 3mm)
2 = Medium (ca. 3.5mm)
3 = Wide (ca. 4mm)

13. SEED

A. SHAPE

[1]
1 = Ovate
2 = Oval
3 = Elliptical

B. CHEEK

[1]
1 = Rounded
2 = Angular

C. BRUSH

[2]
1 = Short
2 = Medium
3 = Long

[1]
1 = Not Collared
2 = Collared

D. CREASE

[1]
1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[2]
1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

E. COLOR

[3]
1 = White
2 = Amber
3 = Red
4 = Other (SPECIFY): _____

F. TEXTURE

[2]
1 = Hard
2 = Soft
3 = Other (SPECIFY): _____

G. PHENOL REACTION (*see instructions*):

[4]
1 = Ivory 4 = Dark Brown
2 = Fawn 5 = Black
3 = Light Brown

H. SEED WEIGHT

[4][1] g/1000 seed (Whole number only)

I. GERM SIZE

[2]
1 = Small
2 = Midsize
3 = Large

14. Disease : (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[1]	**Stem Rust** *(Puccinia graminis* **f. sp.** *tritici)* Race: TTTT	[1]	**Leaf Rust** *(Puccinia recondita* **f. sp.** *tritici)* Races: TNRJ, MCRK
[2]	**Stripe Rust** *(Puccinia striiformis)* Race: PST 100	[0]	**Loose Smut** *(Ustilago tritici)*
[0]	**Tan Spot** *(Pyrenophora tritici-repentis)*	[0]	**Flag Smut** *(Urocystis agropyri)*
[0]	**Halo Spot** *(Selenophoma donacis)*	[0]	**Common Bunt** *(Tilletia tritici* **or** *T. laevis)*
[3]	***Septoria nodorum*** **(Glume Blotch)**	[0]	**Dwarf Bunt** *(Tilletia controversa)*
[0]	***Septoria avenae*** **(Speckled Leaf Disease)**	[0]	**Karnal Bunt** *(Tilletia indica)*
[0]	***Septoria tritici*** **(Speckled Leaf Blotch)**	[2]	**Powdery Mildew** *(Erysiphe graminis* **f. sp.** *tritici)*
[3]	**Scab** *(Fusarium* **spp.)**	[0]	**"Snow Molds"**
[0]	**"Black Point" (Kernel Smudge)**	[0]	**Common Root Rot** *(Fusarium, Cochliobolus* **and** *Bipolaris* **spp.)**
[3]	**Barley Yellow Dwarf Virus (BYDV)**	[0]	**Rhizoctonia Root Rot** *(Rhizoctonia solani)*
[0]	**Soilborne Mosaic Virus (SBMV)**	[0]	**Black Chaff** *(Xanthomonas campestris* **pv.** *translucens)*
[0]	**Wheat Yellow (Spindle Streak) Mosaic Virus**	[0]	**Bacterial Leaf Blight** *(Pseudomonas syringae* **pv.** *syringae)*
[0]	**Wheat Streak Mosaic Virus (WSMV)**	[ ]	**Other (SPECIFY)** _____
[ ]	**Other (SPECIFY)** _____	[ ]	**Other (SPECIFY)** _____
[ ]	**Other (SPECIFY)** _____	[ ]	**Other (SPECIFY)** _____
[ ]	**Other (SPECIFY)** _____	[ ]	**Other (SPECIFY)** _____

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

[1]	**Hessian Fly** *(Mayetiola destructor)* Biotypes: B,C,D,L	[ ]	**Other (SPECIFY)** _____
[0]	**Stem Sawfly** *(Cephus* **spp.)**	[ ]	**Other (SPECIFY)** _____
[0]	**Cereal Leaf Beetle** *(Oulema melanopa)*	[ ]	**Other (SPECIFY)** _____
[0]	**Russian Aphid** *(Diuraphis noxia)*	[ ]	**Other (SPECIFY)** _____

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15. INSECT: *Continued* **(0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)**

PLEASE SPECIFY BIOTYPE (where needed)

[0]	**Greenbug *(Schizaphis graminum)***	[ ]	**Other (SPECIFY)** _____
[0]	**Aphids**	[ ]	**Other (SPECIFY)** _____

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

WHEAT DESCRIPTOR ILLUSTRATIONS

Section numbers correspond to the numbers of the sections on the form.

200600283

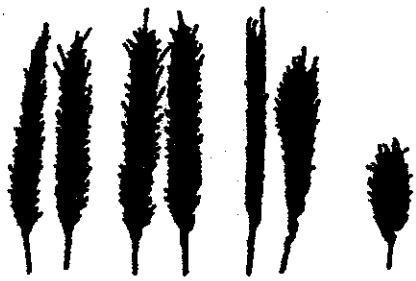
4 EARLY PLANT GROWTH HABIT:

1 Prostrate 2 Intermediate 3 Erect

10 STEM INTERNODE X-SECTION

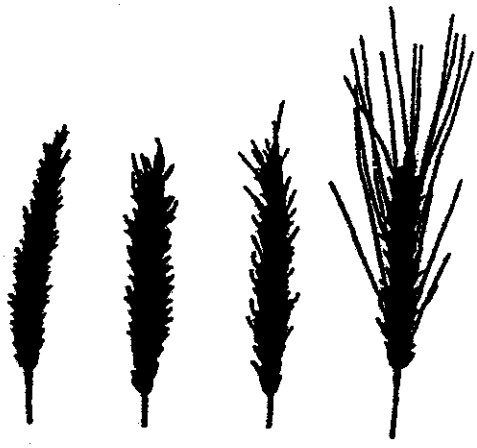
1 Hollow 2 Semi-Solid 3 Solid

11 SPIKE SHAPE



1 Tapering 2 Oblong 3 Clavate 4 Elliptical

11 AWNEDNESS:



1 Awnless 2 Apically Awnleted 3 Awnleted 4 Awned

12 BEAK SHAPE:

1 Obtuse 2 Acute 3 Acuminate

12 SHOULDER SHAPE:

1 Wanting 2 Oblique 3 Rounded 4 Square 5 Elevated 6 Apiculate

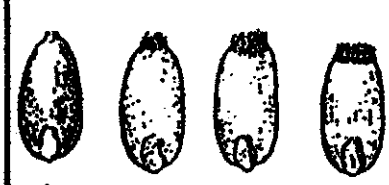
13 SEED SHAPE:

1 Ovate 2 Oval 3 Elliptical

13 CHEEK SHAPE:

1 Rounded 2 Angular

13 BRUSH SIZE:



1 Small 2 Midsized 3 Large Collared

13 BRUSH HAIR LENGTH

1 Short 2 Medium 3 Long

GERM (EMBRYO) SIZE:

1 Small 2 Midsized 3 Large

13 SEED CREASE WIDTH:

1 Narrow 2 Mid-Wide 3 Wide

13 SEED CREASE DEPTH:

1 Shallow 2 Mid-Deep 3 Deep

REFERENCE

Briggle, L.W. and L.P. Reitz. 1963. Classification of Triticum Species and of Wheat Varieties Grown in the United States. Technical Bulletin 1278. United States Department of Agriculture.

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200600283

'176' WHEAT

18D. Exhibit D. Additional Description of the Variety

Wheat variety 176 is a broadly adapted, high yielding, moderately-early heading, medium stature, apically awnleted, soft red winter wheat. Head emergence is similar to that of 'Sisson' and two days earlier than 'McCormick' (Tables 2-11). Average plant height of variety 176 (35 inches) is two inches taller than 'Tribute' and one inch shorter than 'SS520'. Straw strength (0 = no lodging, 9 = completely lodged) of variety 176 is moderately good (range of 0.9 to 5.4 and mean of 2.2) and similar to that of Sisson. In Virginia, average grain yields and test weights of variety 176 in conventional tillage trials (77 bu/ac; 56.7 lb/bu) and no-till trials (94 bu/ac; 56.4 lb/bu) have been similar to those of Pioneer '26R24' (Tables 1-11). It is notable that grain yields of variety 176 in no-till trials have been similar to those of the highest yielding variety Tribute. On the basis of data collected in Celina, OH in 2005, winter hardiness of variety 176 is moderate being hardier than USG3209 but less hardy than Tribute (Table 12). Variety 176 has relatively prostrate early spring growth habit (Tables 4 and 5) and moderate tolerance to spring freeze (Table 10).

Variety 176 has good soft wheat milling quality (Tables 15-16) and produced higher flour yields than McCormick in tests conducted in 2001 (72.9% vs. 71.4% flour yield) and 2002 (78.2% vs. 77.5% flour yield). Pastry baking quality of variety 176 also is good on the basis that flour derived from this line has acceptable water absorption and produces cookies of relatively large diameter (17.8 to 18.5 cm). Flour protein of variety 176 is higher than average in concentration (7.73 to 8.68%) and also in gluten strength with lactic acid retention values of 96 to 115%. Flour from this variety therefore is likely to have multiple end uses in production of both pastries and crackers.

Variety 176 is resistant to powdery mildew (*Blumeria graminis*) and to stripe rust (*Puccinia striiformis*) (Tables 1-12). While seedlings of variety 176 are susceptible to *Puccinia triticina* races TNRJ and MCRK, adult plants of this variety have expressed moderate resistance to leaf rust in field trials. It is moderately resistant to *barley yellow dwarf virus* and glume blotch (*Stagonospora nodorum*), and is moderately resistant to moderately susceptible to fusarium head blight (*Fusarium graminearum*). Variety 176 is susceptible to race TTTT of stem rust (*Puccinia graminis*), while its reaction to leaf blotch (*Septoria tritici*), *wheat spindle streak mosaic virus*, and *soil-borne mosaic virus* is not known. On the basis of independent seedling tests conduct over three years (2001-2003) by USDA-ARS at West Lafayette, IN, variety 176 is resistant to Hessian Fly [*Mayetiola destructor* (Say)] biotype E and susceptible to biotypes B, C, D, and L and, therefore, is postulated to possess genes H7 and H8.

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Table 1. Summary of performance of VA99W-176 in the 1999-2000 Preliminary Wheat Yield Test over 4 locations (Warsaw, Painter, Blacksburg, VA and Plymouth, NC). Numbers below each column heading indicate the number of location upon which data are based.

Line	Yield (bu/a)	Percent of Test Mean (Yield)	Test Weight (lbs/bu)	Heading Date (March 31+)	Plant Height (in)	Lodging (0.2-10)[1]	Powdery Mildew (0-9)[2]	Powdery Mildew on 5/11/00 (0-9)	Leaf Rust (0-9)	BYDV (0-9)	Plant Height on 3/24/00 (in)[3]	Juvenile Plant Growth Habit (0-5)[4]
	4	4	4	2	2	3	2	1	2	2	1	1
VA99W-176	**82.9**	**103.7**	**57.7**	**29**	**37**	**0.5**	**0**	**0**	**5**	**2**	**13**	**1**
ROANE	83.6	104.6	59.1	34	34	0.9	3	0	4	2	10	1
CK9663	76.8	96.1	58.1	30	39	1.6	6	5	0	1	13	1
PION2580	82.7	103.4	56.5	30	37	0.6	2	2	5	2	13	1
FFR555W	60.1	75.2	55.5	35	35	0.3	8	7	7	3	12	1
PION2691	78.7	98.4	55.9	23	33	1.2	2	3	4	1	14	2
PION26R24	85.3	106.7	57.7	30	37	1.2	3	4	5	2	12	2
UGA9482E7	82.0	102.6	57.7	28	37	2.2	2	3	1	1	14	2
USG3209	87.8	109.8	57.6	28	34	1.9	2	3	5	2	14	1
VA99W-73	79.4	99.3	56.7	30	37	0.3	4	5	5	2	13	1
GRAND MEAN	79.9		56.9	30	36	1.1	2	2	3	2	13	1
CV	10.0		1.4	14	4	102.3	77	50	37	91	8	33
LSD	6.2		0.6	4	1	0.9	1	1	1	2	1	1

[1] Belgian lodging scale = area x intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 1 (plants standing upright) to 5 (plants lying totally flat on the ground).

[2] All 0-9 ratings indicate relative disease severity: 0 = no disease present; 9 = total plant infection.

[3] This height measurement serves as an estimate of spring growth habit.

[4] Juvenile Plant Growth Habit: 0 = prostrate; 5 = very erect.

Table 2. Three-year summary of performance of VA99W-176 in the Virginia Tech Wheat Test, 2001, 2002, and 2003 harvests*

Line	Yield (Bu/acre) (18)	Test Weight (Lb/bu) (18)	Date Headed (Mar 31+) (11)	Height (In) (9)	Lodging© (0.2-10) (11)	Powdery Mildew (0-9) (11)	Leaf Rust (0-9) (5)
VA99W-176	**77+**	**56.7-**	**30-**	**35+**	**3.2+**	**1-**	**3+**
TRIBUTE	82+	59.6+	31-	33-	1.9	0-	0-
SS 520(R)	82+	56.9-	30-	36+	2.4	2	3+
McCORMICK	80+	59.1+	32	32-	1.3-	0-	0-
SISSON	79+	57.1	30-	33-	2.9	2	4+
VA97W-375WS	80+	56.7-	31-	32-	2.1	0-	0-
SS 550(B)	79+	56.7-	32	33-	2.7	1-	3+
SS 560(R)	78+	56.7-	33+	34	0.8-	2	3+
PIONEER 26R24(D)	77+	56.8-	31-	36+	2.2	2	3+
USG 3209(RT)	76	56.2-	31-	32-	2.6	1-	4+
Test Average (n=24)	75	57.3	32	34	2.3	2	2
C.V.	9	1.7	3	4	61.7	50	39
L.S.D. (0.05)	2	0.3	1	1	0.7	1	1

* Varieties are ordered by descending yield averages, then by descending test weight averages. A plus or minus sign indicates a performance significantly above or below the test average. The number in parentheses below column headings indicates the number of location-years on which data are based.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

♠ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 3. Two-year summary of performance of VA99W-176 in the Virginia Tech Wheat Test, 2002 and 2003 harvests*

Line	Yield (Bu/acre) (11)		Test Weight (Lb/bu) (11)		Date Headed (Mar 31+) (7)		Height (In) (6)		Lodging© (0.2-10) (6)		Powdery Mildew (0-9) (6)		Leaf Rust (0-9) (4)	
VA99W-176	**76**	**+**	**56.1**	**-**	**29**	**-**	**36**	**+**	**1.6**		**0**	**-**	**3**	**+**
SS 520(R)	81	+	56.9		29	-	37	+	1.1		1		3	+
TRIBUTE	80	+	59.1	+	31		34	-	1.1		0	-	0	-
VA97W-375WS	79	+	56.6		31		33	-	0.9		0	-	0	-
McCORMICK	78	+	58.6	+	31		33	-	0.4	-	0	-	0	-
SS 550(R)	78	+	56.3	-	31		35		1.9	+	1		4	+
SISSON	77	+	56.9		30	-	33	-	1.8	+	1		5	+
SS 560(R)	76	+	56.4		32	+	34	-	0.3	-	2	+	4	+
PIONEER 26R24(B)	73		56.3	-	30	-	36	+	1.3		1		3	+
USG 3209(RT)	71		55.4	-	30	-	33	-	2.0	+	1		5	+
Test Average (n=36)	73		56.7		31		35		1.2		1		2	
C.V.	8		1.7		7		3		82.1		55		45	
L.S.D. (0.05)	3		0.4		1		1		0.6		1		1	

* Varieties are ordered by descending yield averages, then by descending test weight averages.

A plus or minus sign indicates a performance significantly above or below the test average. The number in parentheses below column headings indicates the number of location-years on which data are based.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

❧ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 4. Summary of performance of VA99W-176 in the Virginia Tech Wheat Test, 2001 harvest.*

Line	Yield (Bu/acre) (7)		Test Weight (Lb/bu) (7)		Date Headed (Mar 31+) (4)		Height (In) (3)		Lodging© (0.2-10) (5)		Powdery Mildew (0-9) (4)		Leaf Rust (0-9) (1)		Early Plant Height (In) (1)
VA99W-176	**79**		**57.7**		**31**	-	**32**		**5.4**	+	**1**	-	**2**	+	**15.5**
TRIBUTE(RT)	87	+	60.3	+	33		30		2.8		0	-	0	-	12.2
PIONEER 26R24(B)	84	+	57.8		33		34	+	3.4		3		2	+	15.5
USG 3209(RT)	84	+	57.6		33		28	-	3.3		2	-	1		16.0
McCORMICK(RT)	83	+	60.0	+	34	+	29	-	2.6		0	-	0	-	13.7
SS550	83	+	57.5		33		29	-	3.7		2	-	1		15.5
SISSON (RT)	83	+	57.5		31	-	30		4.3	+	2	-	1		16.2
SS520	83	+	56.9		32	-	33	+	4.0		3		3	+	15.7
SS560	82	+	57.3		35	+	31		1.4	-	3		2	+	13.7
VA97W-375WS	82	+	56.7		31	-	30		3.8		0	-	0	-	16.3
Test Average (n=71)	77		57.3		33		31		3.1		3		1		15.3
C.V.	8		3.5		3		5		5.7		43		47		5.6
L.S.D. (0.05)	4		1.2		1		2		1.1		1		1		

* Varieties are ordered by descending statewide yield averages. A plus or minus sign indicates a performance significantly above or below the test average. The number in parentheses below column headings indicates the number of locations on which data are based.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

♠ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 5. Summary of performance of VA99W-176 in the Virginia Tech Wheat Test, 2002 harvest.*

Line	Yield (Bu/a) (5)	Test Weight (Lb/bu) (5)	Date Headed (Mar31+) (4)	Height (In) (3)	Lodging (0.2-10) (3)	Powdery Mildew (0-9) (3)	Leaf Rust (0-9) (2)	Barley Yellow Dwarf Virus (0-9) (2)	Stripe Rust (0-9) (1)	Fusarium Head Blight Index 0-100 (1)	Early Height (inches) (1)
VA99W-176	**87 +**	**57.9 -**	**24 -**	**35 +**	**1.3**	**0 -**	**3**	**2**	**0**	**12.3**	**6.8**
TRIBUTE	91 +	60.7 +	26	32 -	0.7	0 -	0	1	0	4.7	5.0 -
SS 560(R)	90 +	58.7	27 +	33 -	0.3	2	2	3	0	19.0	6.0
SISSON	90 +	58.6	25 -	32 -	1.5	1 -	4	2	2	10.0	7.3
SS 550(R)	90 +	58.3	26	34	1.3	1 -	3	1	2	11.0	7.0
McCORMICK	89 +	60.0 +	26	32 -	0.5	1 -	0	2	0	4.7	5.5 -
SS 520(R)	87 +	58.2 -	24 -	36 +	0.9	1 -	4	3	2	7.0	8.7 +
USG 3209(RT)	87 +	57.9 -	24 -	31 -	2.0 +	1 -	5	2	0	12.0	8.0
PIONEER 26R24(B)	86 +	58.8	25 -	35 +	0.9	2	3	2	1	9.0	6.3
VA97W-375WS	89 +	58.2 -	26	31 -	0.3	0 -	0	2	0	22.0	6.5
Average (n=65)	81	58.6	26.3	33.7	0.9	1.8	1.8	2.4	0.2	10.9	7.2
C.V.	7	1.1	4	3	89.5	34	43	38	---	55.1	11.4
LSD (0.05)	4	0.4	1	1	0.7	1			---	8.15	1.3

* Varieties are ordered by descending statewide yield averages. These averages do not include yield or test weight data from Blackstone. A plus or minus sign indicates a performance significantly above or below the test average.

The number in parentheses below column headings indicates the number of locations on which data are based.

Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

**Wheat line having white seed color.

Early height (March 8) is an indication of the daylength sensitivity of a variety. Taller varieties began jointing in early March and thus were taller.

Table 6. Performance summary of VA99W-176 in the Virginia Tech Wheat Test, 2003 harvest.*

Line	Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Mar31+)	Height (In)	Lodging (0.2-10)	Powdery Mildew	Leaf Rust (0-9)	Glume Blotch	Fusarium Head Blight Index (0-100)
	(5)	(5)	(3)	(3)	(3)	(4)	(2)	(2)	(1)
VA99W-176	**70 +**	**55.2 +**	**36 -**	**38 +**	**1.9**	**0 -**	**2**	**2 -**	**12.0**
SS 520(R)	77 +	56.2 +	36 -	38 +	1.2	1	3 +	1 -	14.0
TRIBUTE	71 +	57.6 +	37	36	1.6	0 -	1 -	1 -	10.5
SS 550(B)	69 +	54.6	38	36	2.4 +	0 -	6 +	1 -	13.5
McCORMICK	68 +	57.2 +	37	34 -	0.2 -	0 -	0 -	2 -	4.5
SISSON	68 +	55.5 +	36 -	35 -	2.1	1	7 +	2 -	15.5
SS 560(R)	66 +	54.1	39	35 -	0.3 -	2 +	6 +	2 -	10.5
PIONEER 26R24(D)	64	54.2	37	38 +	1.6	1	3 +	2 -	13.0
USG 3209(RT)	60 -	53.1 -	38	35 -	2.0	1	6 +	3	6.0
VA97W-375WS	72 +	55.4 +	37	34 -	1.5	0 -	0 -	2 -	31.5
Average	63	54.4	38	36	1.5	1	2	3	12.2
LSD (0.05)	3	0.8	2	1	0.9	1	1	1	13.9
C.V.	8	2.2	6	3					68.3

* Varieties are ordered by descending statewide yield averages.
A plus or minus sign indicates a performance significantly above or below the test average.
The number in parentheses below column headings indicates the number of locations on which data are based.
Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.
The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

Table 7. Three-year summary of performance of VA99W-176 in the Virginia Tech No-Till Wheat Test at Warsaw, 2001, 2002, and 2003 harvests.*

Line	Yield (Bu/acre)		Test Weight (Lb/bu)		Date Headed (Mar31+)		Height (In)		Powdery Mildew (0-9)	
VA99W-176	**94**	**+**	**56.4**		**30**	**-**	**30**	**+**	**0**	**-**
TRIBUTE	95	+	60.0	+	31	-	29		0	-
McCORMICK	92	+	59.2	+	32		28	-	0	-
SS 550(B)	92	+	56.6		31	-	28	-	1	
SISSON	92	+	56.4		29	-	27	-	1	
PIONEER 26R24(D)	90	+	56.7		31	-	30	+	1	
SS 520(R)	90	+	56.2		29	-	31	+	1	
SS 560(R)	87		56.0		32		28	-	1	
USG 3209(RT)	86		56.2		32		27	-	1	
VA97W-375WS	84		56.4		30	-	26	-	0	-
Location Average (n=24)	85		57.0		32		29		1	
C.V.	7		2.3		3		4		64	
LSD (0.05)	5		1.1		1		1		1	

* Varieties are ordered by descending yield averages, then descending test weights . A plus or minus sign indicates a performance significantly above or below the test average. There is only one rep of data for powdery mildew and freeze damage. Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.
The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

Table 8. Two-year summary of performance of VA99W-176 in the Virginia Tech No-Till Wheat Test at Warsaw, 2002 and 2003 harvests.*

Line	Yield (Bu/acre)		Test Weight (Lb/bu)		Date Headed (Mar31+)		Height (Inches)		Lodging (0.2-10.0)		Powdery Mildew (0-9)		Leaf Rust (0-9)	
VA99W-176	**90**	**+**	**54.5**	**-**	**28**		**31**	**+**	**1.2**		**0**	**-**	**4**	**+**
TRIBUTE	95	+	59.1	+	29		30		0.3		0	-	1	
McCORMICK	94	+	58.3	+	29		29	-	1.8		0	-	1	
PIONEER 26R24(D)	90	+	55.4		29		32	+	1.4		1		4	+
SS 550(B)	90	+	55.1		29		29	-	2.1		1		4	+
SISSON	87		54.7		27	-	29	-	0.9		1		5	+
SS 560(R)	86		55.1		30		30		0.3		1		4	+
SS 520(R)	85		54.9		27	-	33	+	1.3		1		3	
VA97W-375WS	81		55.0		28		26	-	0.4		0	-	1	
USG 3209(RT)	80		54.8		29		29	-	0.7		1		3	
Location Average (n=36)	82		55.5		29		30		1.0		1		3	
C.V.	7		1.5		9		4		118.4		66		46	
LSD (0.05)	6		0.9		2		1		1.2		1		1	

* Varieties are ordered by descending yield averages, then descending test weights . A plus or minus sign indicates a performance significantly above or below the test average. There is only one rep of data for powdery mildew and freeze damage.

Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

Table 9. Summary of performance of VA99W-176 in the Virginia Tech No-till Wheat Test at Warsaw, 2001 harvest.*

Line	Yield (Bu/acre)		Test Weight (Lb/bu)	Date Headed (Mar 31+)		Height (In)		Powdery Mildew (0-9)	
VA99W-176	**100**	**+**	**59.8**	**33**	**-**	**29**	**+**	**0**	**-**
SISSON (RT)	100	+	59.8	33	-	25	-	1	
TRIBUTE	97	+	61.1	35	-	27		0	-
SS520	97	+	58.4	33	-	29	+	0	-
USG 3209(RT)	97	+	58.2	36		25	-	0	-
SS550	94		59.3	35	-	24	-	0	-
VA97W-375WS	90		59.1	37	+	23	-	0	-
PIONEER 26R24(B)	90		58.7	37	+	27		2	+
SS560	89		57.8	36		27		1	
McCORMICK	88		60.6	37	+	25	-	0	-
Test Average (n=71)	88		58.3	36		27		1	
L.S.D. (0.05)	9		5.9	1		1		1	
C.V.	7		7.3	3		4		68	

* Varieties are ordered by descending yield averages. A plus or minus sign indicates a performance significantly above or below the test average.

♦ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 10. Summary of performance of VA99W-176 in the Virginia Tech No-Till Wheat Test, 2002 Warsaw*

Line	Yield (Bu/acre)	Test Weight (Lb/bu)	Lodging (0.2-10)	Date Headed (Mar31+)	Height (In)	Powdery Mildew one rep (0-9)	Leaf Rust (0-9)	Freeze Damage one rep (1-5)
VA99W-176	**92 +**	**52.5**	**1.5**	**19 -**	**31 +**	**1**	**7 +**	**2**
TRIBUTE	101 +	57.3 +	0.4	20 -	29 -	0	2 -	1
McCORMICK	98 +	56.1 +	3.4 +	22 +	30	1	3 -	1
SS 560(R)	96	54.4	0.3	21	30	1	7	2
SS 550(R)	96 +	53.2	1.5	20 -	30	1	7 +	3
SS 520(R)	91 +	52.8	0.3	20 -	31 +	2	6	2
SISSON	90 +	52.3 -	0.6	18 -	28 -	3	7 +	2
VA97W-375WS	89 +	53.3	0.5	19 -	27 -	0	2 -	2
PIONEER 26R24(B)	89 +	53.2	1.9	20 -	30	3	8 +	2
USG 3209(RT)	80	52.7	1.2	20 -	27 -	4	5	4
Location Average (n=65)	82	53.6	1.1	21	30	3	5	24
LSD (0.10)	7	1.1	1.4	1	1	---	2	---
C.V.	8	1.8	112.0	5	4	---	35	---

* Varieties are ordered by descending yield averages. A plus or minus sign indicates a performance significantly above or below the test average. There is only one rep of data for powdery mildew and freeze damage.

Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

The freeze damage ratings 1-5 are 1=no damage and 5=all early tillers killed.

Table 11. Summary of performance of VA99W-176 in the Virginia Tech No-Till Wheat Test at Warsaw, 2003 harvest.*

Line	Yield (Bu/a)	Test Weight (Lb/bu)	Lodging (0.2-10)	Date Headed (Mar31+)	Ht. (In)	Powdery Mildew (0-9)	Leaf Rust
VA99W-176	**89 +**	**57.2**	**0.9**	**37**	**32**	**0 -**	**1**
PIONEER 26R24(D)	90 +	58.3	1.0	37	35 +	1	1
McCORMICK	88 +	61.3 +	0.2	37	29 -	0 -	0 -
TRIBUTE	86 +	61.4 +	0.2	37	30	0 -	0 -
SISSON	83	57.9	1.2	36	30	1	4 +
SS 550(B)	83	57.5	2.7 +	38	28 -	1	1
USG 3209(RT)	79	57.6	0.2	39	30	0 -	2 +
SS 520(R)	78	57.7	2.3	35 -	35 +	1	1
SS 560(R)	73	56.0 -	0.2	39	29 -	1	1
VA97W-375WS	71	57.2	0.2	37	26 -	0 -	0 -
Average	76	57.4	0.9	38	31	1	1
LSD (0.05)	8	1.0	1.5	3	2	1	1
C.V.	6	1.0		7	4		

* Varieties are ordered by descending one-year yield averages. The years 2001 and 2002 had 4 replications; the year 2003 had 3 replications. Data other than yield is given for 2003 harvest only. A plus or minus sign indicates a performance significantly above or below the test average. Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.
The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

Table 12. Summary of Performance of Wheat Variety 176 (VA99W-176) in Replicated Yield Tests Conducted in VA, AR and OH in 2005.

		MEAN	Entry	MEAN	VA-OVT	WPB-OH	MEAN	MEAN	VA-OVT	VA-OVT	MEAN	MEAN
		Yield	Rank	Tswt	Heading	W. Kill	HT	Lodge	PM	BYDV	LR	YR
ENT#	LINE	(Bu/a)	By Mean Yield	(Lb/bu)	Julian	0-9	Inch	0-9	0-9	0-9	0-9	0-9
	No. Locs=	10		10	3	1	5	4.0	4	4	6	3
36	VA99W-176	87.8	7	60.4	126	6	39	1.6	0	3	3.0	1.8
1	MASSEY	64.4	40	57.8	129	7	39	1.7	1	4	7.0	4.7
2	SISSON	72.7	33	54.9	128	6	34	3.8	0	4	5.3	6.4
3	McCORMICK	77.4	28	60.2	130	5	35	1.6	0	2	5.7	1.3
4	USG 3342	64.7	39	50.8	128	6	32	1.9	0	4	1.0	4.9
5	Dominion	81.7	19	60.2	130	8	33	1.0	0	3	2.3	1.6
35	SS-MPV 57	90.7	5	59.9	131	6	39	0.6	1	3	2.7	3.9
43	PIONEER 26R15	86.8	10	59.9	129	5	37	0.9	0	2	1.3	2.2
45	TRIBUTE	75.3	29	56.7	129	4	35	1.3	0	2	1.3	4.4
49	RENWOOD 3260	72.6	34	53.4	127	6	36	1.8	0	1	1.3	4.9
64	USG 3209	82.6	14	59.2	128	8	33	1.5	0	3	4.3	2.3
	Mean	79.5		58.2	129	6	35	1.2	0	3	1.9	3.3
	C.V.				3	10			158	25		
	L.S.D. 5%				1	0.82			0	1		

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Table 15. Milling and baking quality of VA99W-176 in the 2000-2001 Virginia State Wheat Nursery.

LINE	Mill Score	Bake Score	Flour Yield	Softness Equivalent	Flour Protein	Water Absorb	Cookie Diameter	Gluten Strength
			%	%	%	%	cm	(lactic acid)
Pioneer 26R24 (Std)	**100.0 A**	**100.0 A**	**72.3**	**56.7**	**7.79**	**58.9**	**17.79**	**114.3**
VA99W-176	**99.1 B**	**98.1 B**	**72.9**	**52.1 ***	**7.73**	**59.9**	**18.52**	**115.2**
Pearl	97.8 B	102.9 A	72.2	54.2	7.41	58.8	18.59	114.3
Sisson	96.1 B	80.7 E	72.3	50.9 *	7.56	60.6*	17.34*	91.8
McCormick	95.4 B	92.0 C	71.4*	54.1	7.55	60.4	17.71	117.2
Tribute	91.4 C	79.0 F	71.1*	49.1**	7.2	64.2**	17.77	119.2
USG 3209	86.5 D	85.3 D	70.2**	48.2**	7.38	63.3**	18.00	111.1
AGS 2000	104.1 A	105.8 A	74.7	55	7.64	56.9	18.85	105
SS 520	102.4 A	106.0 A	73.5	55.1	7.83	56.7	18.32	118.3
SS 550	94.1 C	97.6 B	71.4*	53.2 *	6.64	60.5	18.28	102.9
SS 560	94.5 C	105.4 A	71.3*	55.1	7.65	58.1	18.41	88.3
VA97W-375WS	93.5 C	93.9 C	71.8	50.5**	8.14	59.4	17.85	93.1

*One standard deviation below the check variety

**Two standard deviations below the check variety

Table 16. Milling (Allis-Chalmers) and baking quality of VA99W-176 in the 2001-2002 Virginia State Wheat Nursery.

	Mill Score	Bake Score	Break Flour %	Straight Grade Flour Yield %	Fri-ability	E. S. I. Soft Equiv. %	Millability	Flour Protein %	Water Absorb %	Cookie Diameter cm	Gluten Strength (lactic acid)
Sisson (standard)	**100.0 A**	**100.0 A**	**29.7**	**77.7**	**29.5**	**9.9**	**117.0**	**7.9**	**58.1**	**17.8**	**77.9**
VA99W-176	**105.0 A**	**96.4 B**	**26.1 ***	**78.2**	**29.4**	**8.4**	**119.5**	**8.68***	**57.8**	**17.83**	**96**
McCormick	101.1 A	100.0 A	30.3	77.5	29.1	8.9	111.7	8.29	59	17.83	96.2
Tribute	98.8 B	70.9 F	26.7 *	77.7	28.6 *	9.4	109.6	8.1	60.1 *	17.3 *	101
USG 3209	85.3 D	98.1 B	30.3	76.6**	27.1**	10.9*	93.8 **	7.83	60.8 *	17.92	87.5
AGS 2000	110.0 A	105.1 A	29.8	79.8	31.2	6.5	134.7	8.15	57.4	18.06	86
Pioneer 26R24	92.2 C	100.7 A	32.8	76.7 *	28.4 *	10.1	104.7 *	7.78	57.5	17.7	88.9
SS 520	106.7 A	105.9 A	29.2	78.1	30.1	8.6	118.5	7.73	53.3	18.19	85.9
SS 550	89.7 D	101.0 A	31.3	76.7 *	28.1 *	10.6*	103.8 *	7.5	60.2 *	18.04	77.5
SS 560	87.3 D	106.7 A	32.3	76.8 *	27.4**	10.8*	103.8 *	7.44	58.1	18.1	75
VA97W-375WS	95.5 B	104.5 A	28.1	77.0 *	27.9 *	9.3	110.6	8.42*	54.9	18.45	76.5

*One standard deviation below the check variety

**Two standard deviations below the check variety

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued *(7 U.S.C. 2421)*. The information is held confidential until the certificate is issued *(7 U.S.C. 2426)*.

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Virginia Tech Intellectual Properties, Inc.	VA99W-176	176
4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	**5. TELEPHONE** *(Include area code)*	**6. FAX** *(Include area code)*
Virginia Tech Intellectual Properties, Inc. **2200 Kraft Drive, Suite 1050** **Blacksburg, VA 24060**	540-951-9374	540-951-5292
	7. PVPO NUMBER 200600283	

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain.** [X] **YES** [ ] **NO**

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? **If no, give name of country.** [X] **YES** [ ] **NO**

10. Is the applicant the original owner? [ ] **YES** [X] **NO** **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?
[ ] **YES** [ ] **NO** **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?
[X] **YES** [ ] **NO** **If no, give name of country**

11. Additional explanation on ownership *(If needed, use the reverse for extra space)*:

Original owner Virginia Polytechnic Institute and State University assigned its owernship to current owner Virginia Tech Intellectual Properties, Inc. (See attached)

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

PLANT GERMPLASM ASSIGNMENT

DISCLOSURE NO	TITLE
04.018	VA99W-176 Wheat
04.019	VA97W-375WS Wheat
04.020	VA99W-73 Wheat
04.021	VAN00W-186 Wheat
04.048	Teejay (Peanut)

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY (hereinafter referred to as the "UNIVERSITY"), assigns to VIRGINIA TECH INTELLECTUAL PROPERTIES, INC. (hereinafter referred to as "VTIP") all rights, title and interest in and to all of the above-listed GERMPLASMS as held by the UNIVERSITY.

The UNIVERSITY, by its authorized agents, agrees that it will execute all necessary assignments as requested by VTIP, to facilitate the filing of patent applications and/or copyright registrations. It will render any reasonable assistance requested to aid in preparation of such applications and/or registrations.

The UNIVERSITY shall retain the right to make use of the GERMPLASMS for internal research and other non-commercial purposes without cost to the UNIVERSITY.

All royalties, rents, payments, or any cash receipts from the sale, assignment, transfer, licensing or use of the GERMPLASMS shall be the property of VTIP and shall be distributed according to the provisions of the Virginia Agricultural Experiment Station (VAES) Plant Germplasm Release Policy (PGRP).

Prior to the execution of this Assignment, the UNIVERSITY has not granted the right of license to make, use, or sell said GERMPLASMS to anyone except to VTIP, nor has it otherwise encumbered its rights, title and interest in said GERMPLASMS, and it will not execute any instrument in conflict with this Assignment.

IN WITNESS WHEREOF, the UNIVERSITY has caused this Assignment to be signed this 4th day of June, 2004.

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

BY _____
MINNIS E. RIDENOUR
Chief Operating Officer

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200600283

STATE OF VIRGINIA

COUNTY OF MONTGOMERY, to-wit:

The foregoing instrument was acknowledged before me this 4th day of June, 2004, by Minnie E. Ridenour of Virginia Polytechnic Institute and State University, on behalf of said University.

Gerry M. Chenault
Notary Public

My commission expires: 2/28/07

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